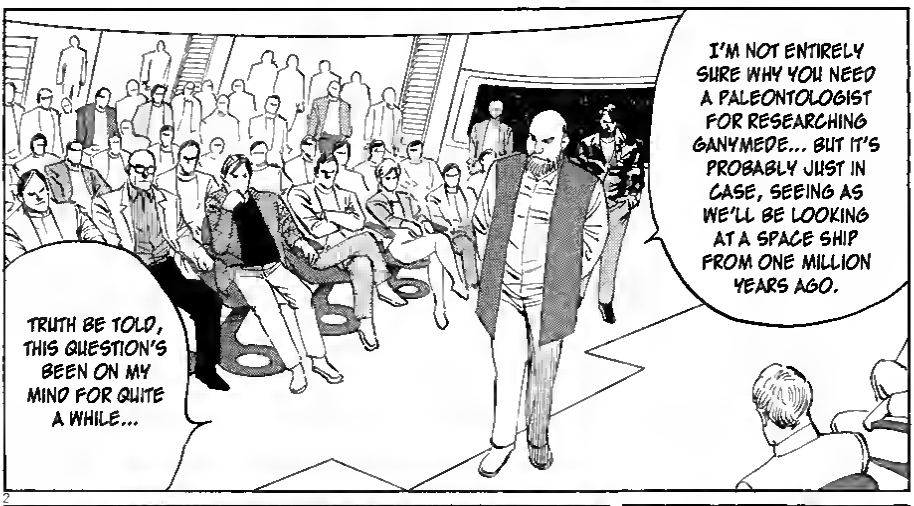
Chapter 10 ...

The Dinosaur Paradox

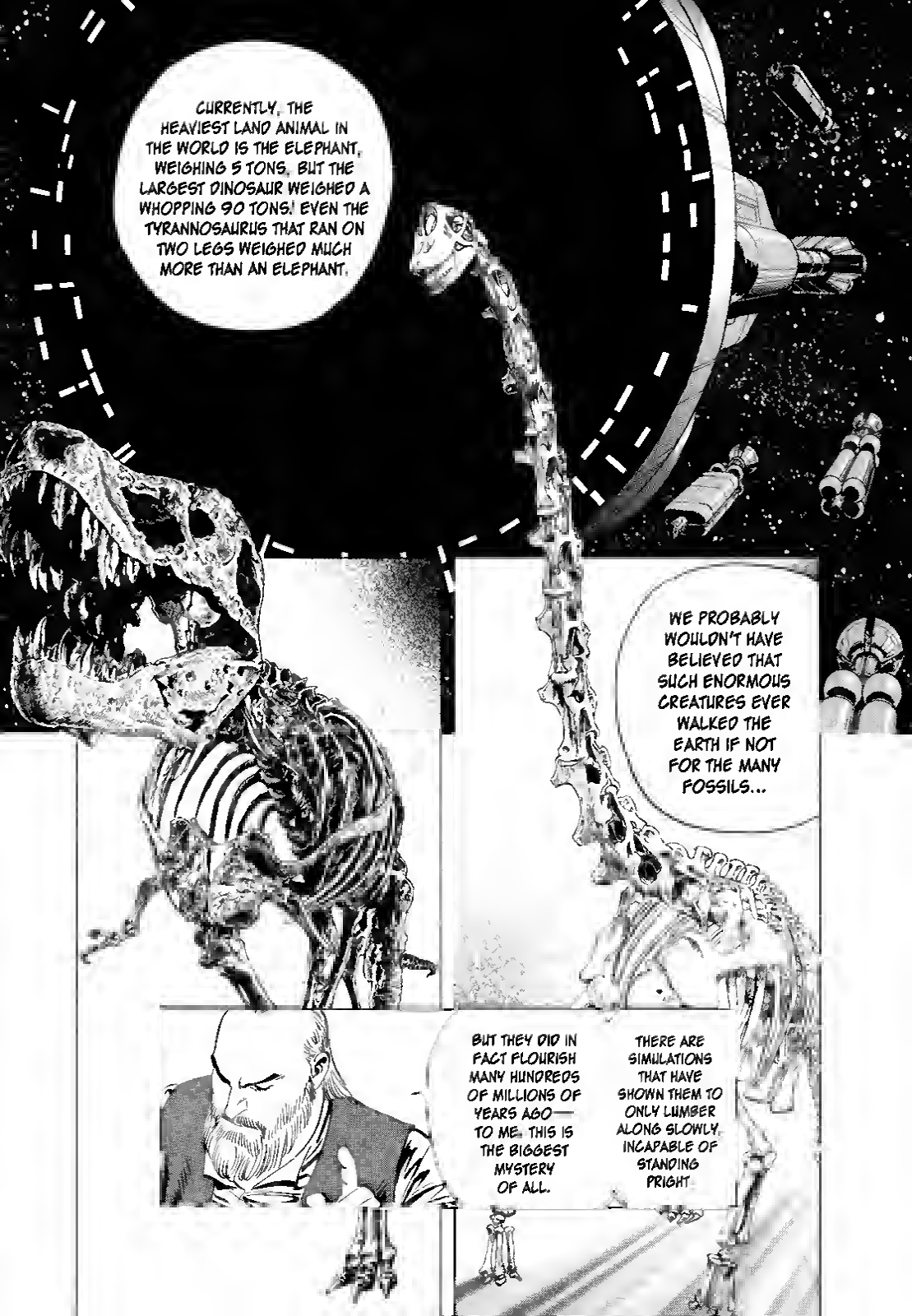
Scanning & Typesetting: GGpX
Translation: Eikin
Editing: Nitouryu & rula
Quality Check: Chuuka & satirod
www.illuminati-manga.com
#illuminati-manga@irc.irchighway.net

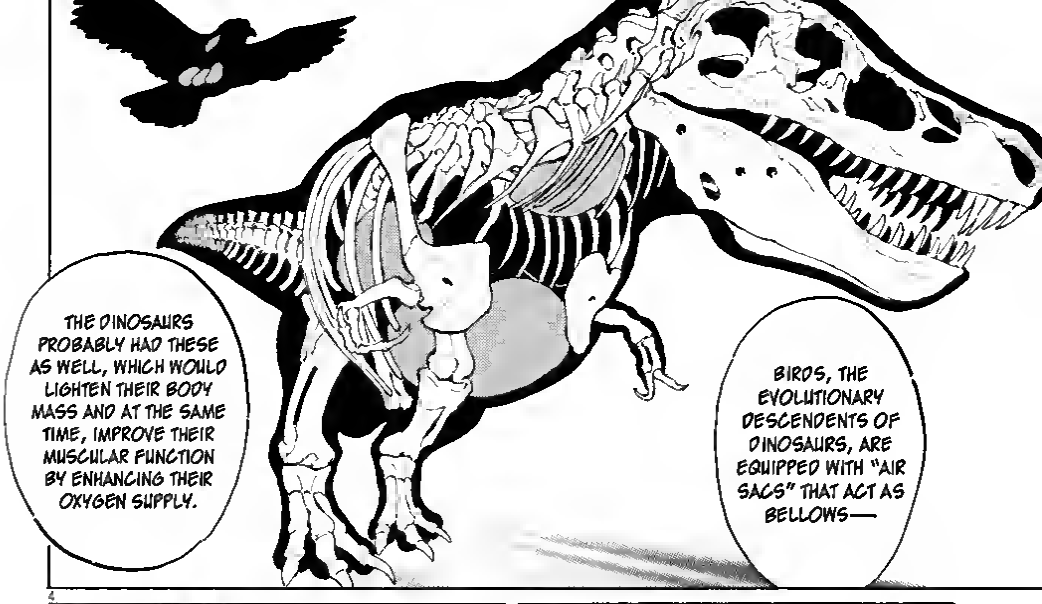
I'M DANIEL CHAMBERLAIN, A PALEONTOLOGIST.


I'M NOT ENTIRELY SURE WHY YOU NEED A PALEONTOLOGIST FOR RESEARCHING GANYMEDE... BUT IT'S PROBABLY JUST IN CASE, SEEING AS WE'LL BE LOOKING AT A SPACE SHIP FROM ONE MILLION YEARS AGO.
TRUTH BE TOLD, THIS QUESTION'S BEEN ON MY MIND FOR QUITE A WHILE...

SPECIFICALLY, THE WEIGHT OF A DINOSAUR— THOSE ANCIENT CREATURES WITH ENORMOUS MASSES— JUST HOW DID THEY MOVE SO FREELY IN THE PAST...?

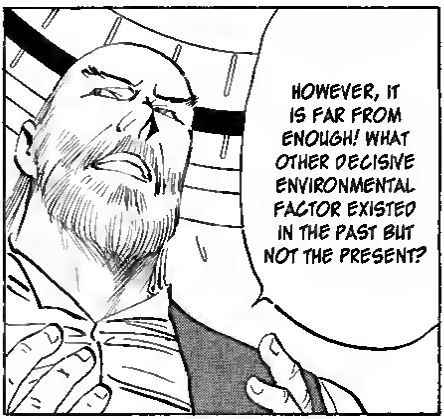
DINO-SAURS...


CURRENTLY, THE HEAVIEST LAND ANIMAL IN THE WORLD IS THE ELEPHANT, WEIGHING 5 TONS. BUT THE LARGEST DINOSAUR WEIGHED A WHOPPING 90 TONS! EVEN THE TYRANNOSAURUS THAT RAN ON TWO LEGS WEIGHED MUCH MORE THAN AN ELEPHANT.
WE PROBABLY WOULDN'T HAVE BELIEVED THAT SUCH ENORMOUS CREATURES EVER WALKED THE EARTH IF NOT FOR THE MANY FOSSILS...
BUT THEY DID IN FACT FLOURISH MANY HUNDREDS OF MILLIONS OF YEARS AGO— TO ME. THIS IS THE BIGGEST MYSTERY OF ALL.
THERE ARE SIMULATIONS THAT HAVE SHOWN THEM TO ONLY LUMBER ALONG SLOWLY, INCAPABLE OF STANDING PRIGHT

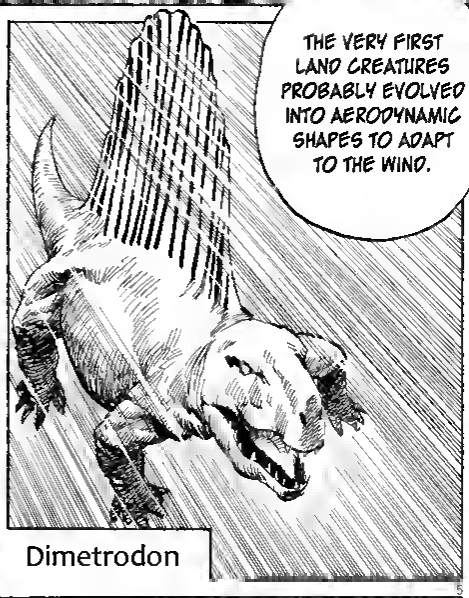

THE DINOSAURS PROBABLY HAD THESE AS WELL, WHICH WOULD LIGHTEN THEIR BODY MASS AND AT THE SAME TIME, IMPROVE THEIR MUSCULAR FUNCTION BY ENHANCING THEIR OXYGEN SUPPLY.
BIRDS, THE EVOLUTIONARY DESCENDENTS OF DINOSAURS, ARE EQUIPPED WITH "AIR SACS" THAT ACT AS BELLOWS—

4

IF THE EARTH DID NOT HAVE ITS MOON, ITS ROTATIONAL SPEED WOULD BE THREE TIMES AS FAST, AND ALL MASSES WOULD WEIGH 10% LIGHTER DUE TO THE CENTRIFUGAL FORCE— THIS IS CLEARLY ADVANTAGEOUS FOR DINOSAURS.
IF THAT'S THE CASE... RATHER THAN SAYING IT WOULD BE A BARREN LAND BLASTED BY TERRIFIC GALES BLOWING FROM EAST TO WEST—


HOWEVER, IT IS FAR FROM ENOUGH! WHAT OTHER DECISIVE ENVIRONMENTAL FACTOR EXISTED IN THE PAST BUT NOT THE PRESENT?

Edaphosaurus

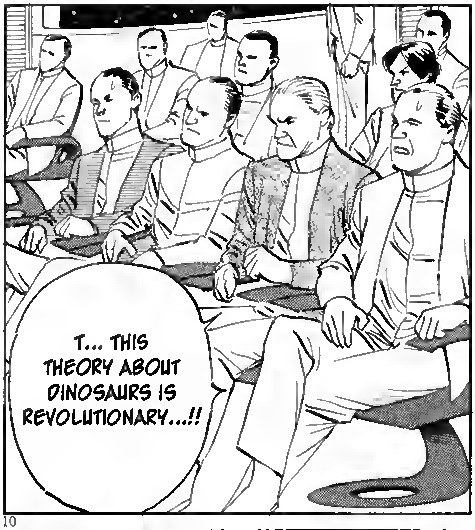

THE VERY FIRST LAND CREATURES PROBABLY EVOLVED INTO AERODYNAMIC SHAPES TO ADAPT TO THE WIND.
Dimetrodon

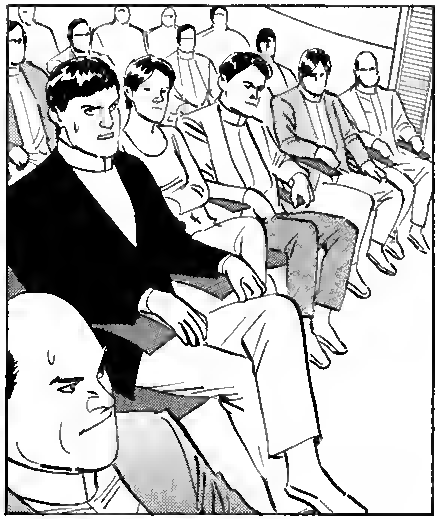
ALSO, THE WIND FORCE WAS SOMEWHAT WEAKER CLOSE TO THE GROUND, SO INSECTS AND SMALL ANIMALS THAT NESTED UNDERGROUND WOULD SLOWLY MAKE THEIR WAY OUT OF THE FOREST.
Diictodon

MEANWHILE, UP IN THE TREETOPS OF THE FORESTS THAT OBSTRUCTED THE WIND, EVOLUTION TOOK ANOTHER ROUTE...
THEY DEVELOPED FEATHERS TO MAKE USE OF THE STRONG WINDS FOR GLIDING——
Archaeopteryx (the first bird)
EVOLUTION JUST NEEDED TO CONQUER HEIGHTS.
AND SO, REALISING THAT WHILE THE WINDS WERE STRONG [illegible], THERE WERE NO COMPETITORS——

WITH MASSIVE BODY WEIGHT, THEY WOULDN'T BE BLOWN AWAY BY THE WIND ANYMORE, AND THEY COULD MONOPOLISE THE LEAVES ON TALL TREES.
LONG NECKS AND TAILS WOULD ASSIST WITH THEIR BALANCE AND ALSO ACT AS RUDDERS TO STEER IN THE WIND—
WINDS GUSTING IN FROM THE BACK WOULD STREAM PAST THE HUGE BODIES— THEY WOULD BECOME SHIPS THAT WALKED THE LAND.

Diplodocs


T... THIS THEORY ABOUT DINOSAURS IS REVOLUTIONARY...!!



10

BUT WON'T THAT MEAN THAT THOSE DINOSAURS COULD ONLY EVER PROGRESS WESTWARD? THEY'D BE SLAVES TO THE WIND.
SO WHAT HAPPENS IF THEY STOP OR RUN INTO A CLIFF? WOULD THEY COME TO A HALT, FOREVER FACING THE SAME DIRECTION, AND LIVE ON HAPPILY EVER AFTER?

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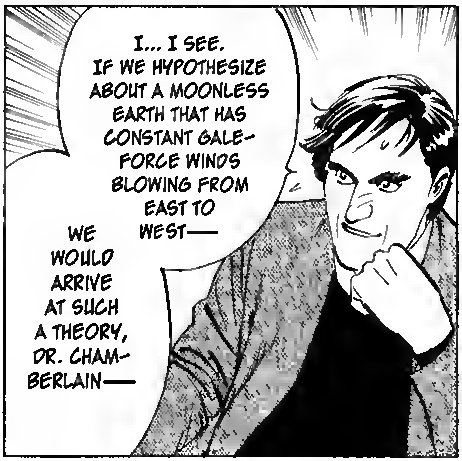
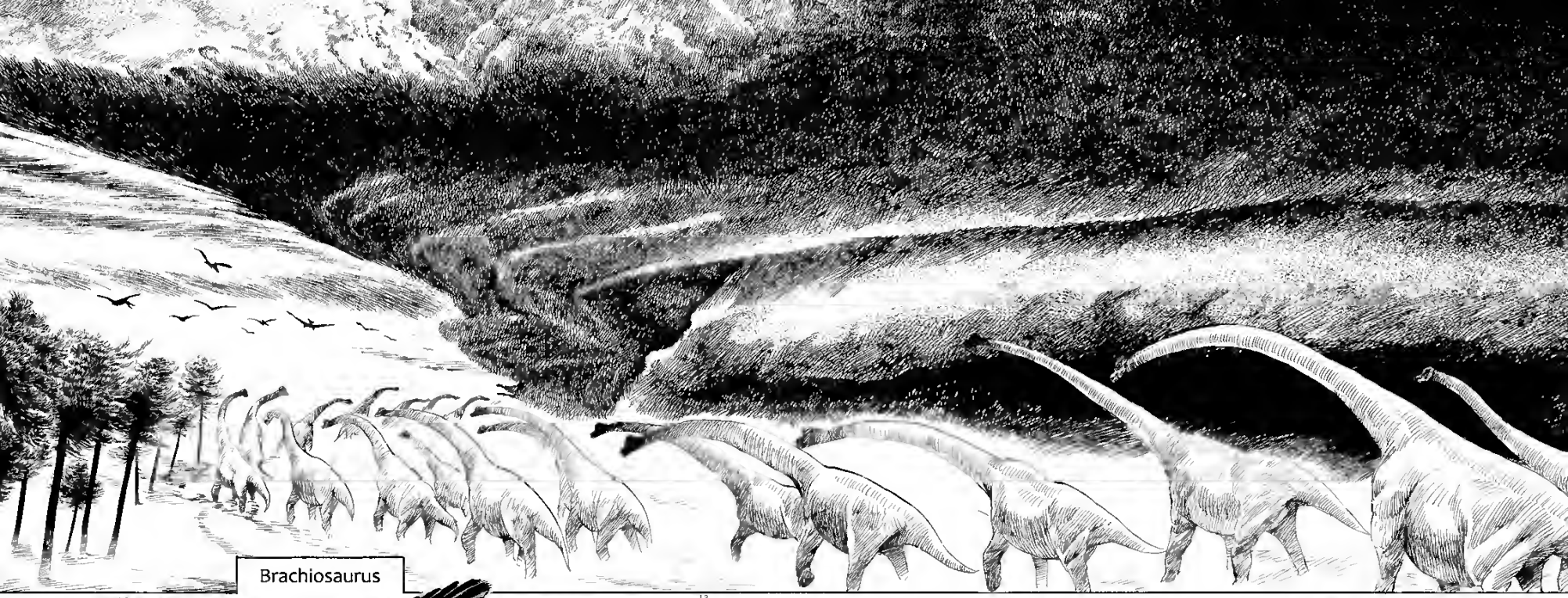
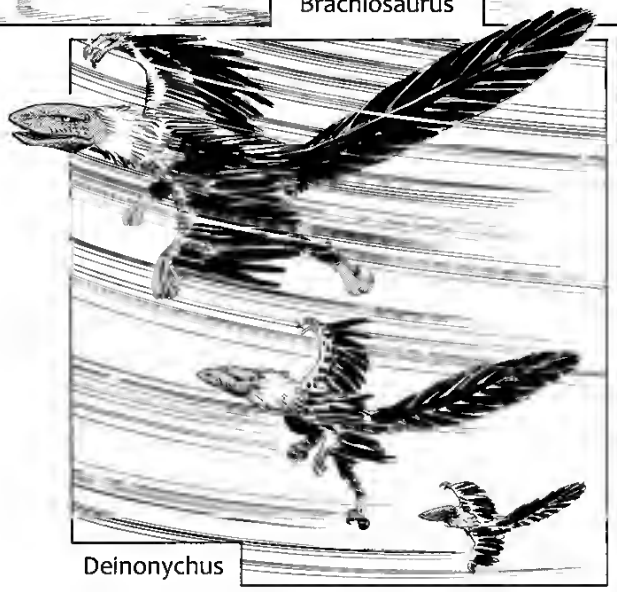

I... I SEE. IF WE HYPOTHESIZE ABOUT A MOONLESS EARTH THAT HAS CONSTANT GALE-FORCE WINDS BLOWING FROM EAST TO WEST——
WE WOULD ARRIVE AT SUCH A THEORY, DR. CHAMBERLAIN——

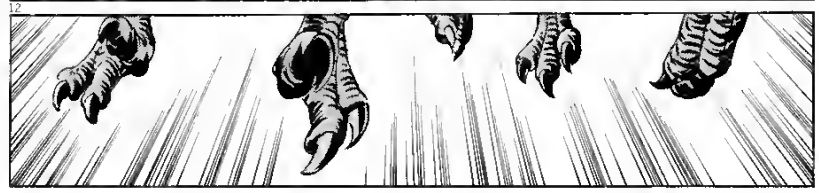
HAHAHA...
——PRECISELY. THEY'D BE QUITE FREQUENT, ACTUALLY.
BACK THEN, THERE'D HAVE BEEN SUPER HURRICANES WITH WINDSPEEDS OF 300 KILOMETERS PER HOUR, ISN'T THAT RIGHT, PROFESSOR ARSLAN?
11
HM... FOR THE DINOSAURS THAT MOVE IN LINE WITH THE WIND, IT COULD BECOME AN ENORMOUS CORRIDOR FOR THEM. THEIR DIRECTION OF ADVANCE WOULD CONSTANTLY BE CHANGING AND THEY COULD EVEN BE CIRCLING THE PERIMETER ALL THE TIME.
THERE'S ALSO JUPITER'S GREAT RED SPOT, ANOTHER SUPER HURRICANE. IF WE TAKE THAT AS AN EXAMPLE, IT'S ENTIRELY POSSIBLE THAT IT COULD BE SITUATED OVER AN AREA PERMANENTLY——


Brachiosaurus


Deinonychus

13

SMALL CARNIVOURS WON'T GET CLOSE TO SUPER HURRICANES... BUT IT'S POSSIBLE THAT THERE ARE THOSE THAT MAKE USE OF THE WINDS IN THE STORMS TO LAUNCH THEIR ATTACKS.


12

THERE ARE SPECIES THAT USE THEIR FEATHERS TO MANIPULATE THE WIND TO MAKE QUICK, AGILE MOVEMENTS...

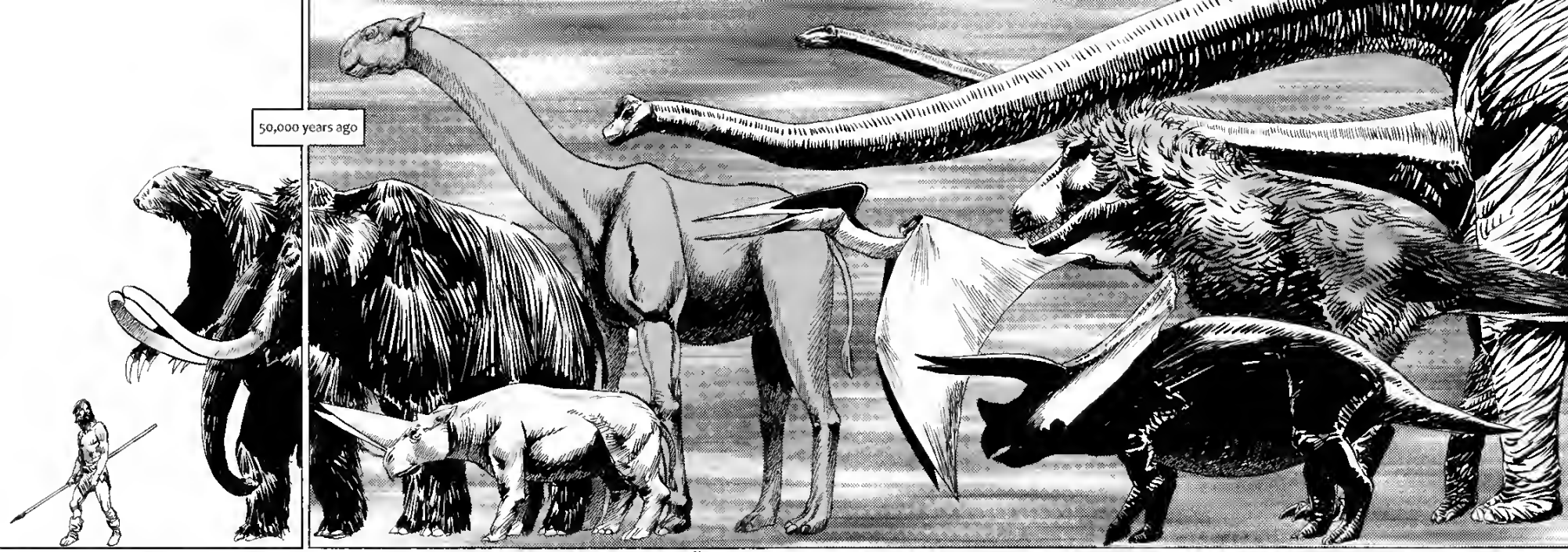
AT THE PINNACLE IS THE TYRANNOSAURUS REX.
15
Tyrannosaurus
Triceratops

WHY DID DINOSAURS EVOLVE TO BE MASSIVE AND HEAVY...?
WHY DID THEY HAVE SUCH PECULIAR SKULL STRUCTURE?
WHY DID THEY DEVELOP FEATHERS?

Quetzalcoatlus
HOW COULD DINOSAURS WITH ENORMOUS WINGSPANS FLOURISH DESPITE AN INABILITY TO FLY ON THEIR OWN?
THE ANSWER LIES WITH THE "WIND".

THE ASTEROID IMPACT 65 MILLION YEARS AGO THAT WAS SAID TO WIPE OUT ALL DINOSAURS MIGHT HAVE TRIGGERED AN EXTREME CHANGE IN THE HOT, HUMID CLIMATE.
HOWEVER, THE WIND DIDN'T DIE DOWN...

Indricotherium
REPLACING THE ERA OF DINOSAURS WAS THE DAWN OF THE AGE OF MAMMALS, WHICH TOO EVOLVED TO BECOME GIANTS, AND EVOLVED PECULIAR PROTUBERANCES TO ADAPT TO THE WIND...
Uintatherium
Megatherium
Sivatherium


50,000 years ago

21

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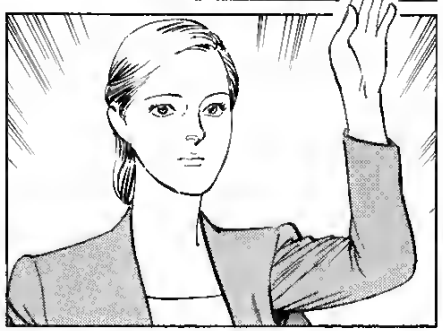
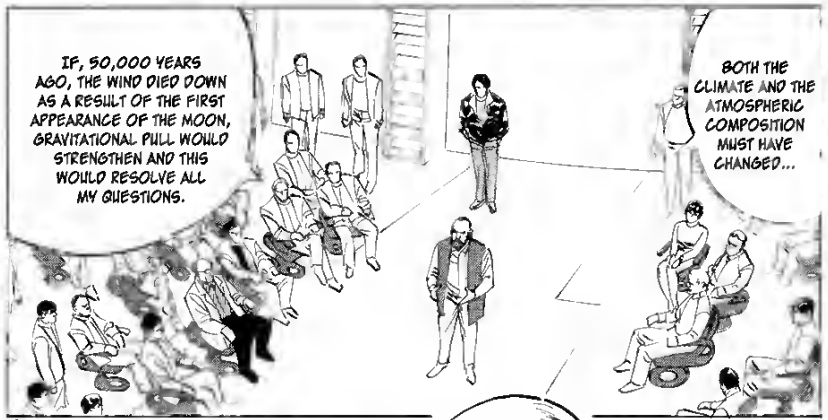


THANKS, PROFESSOR CHAMBERLAIN. THAT WAS VERY INTERESTING...

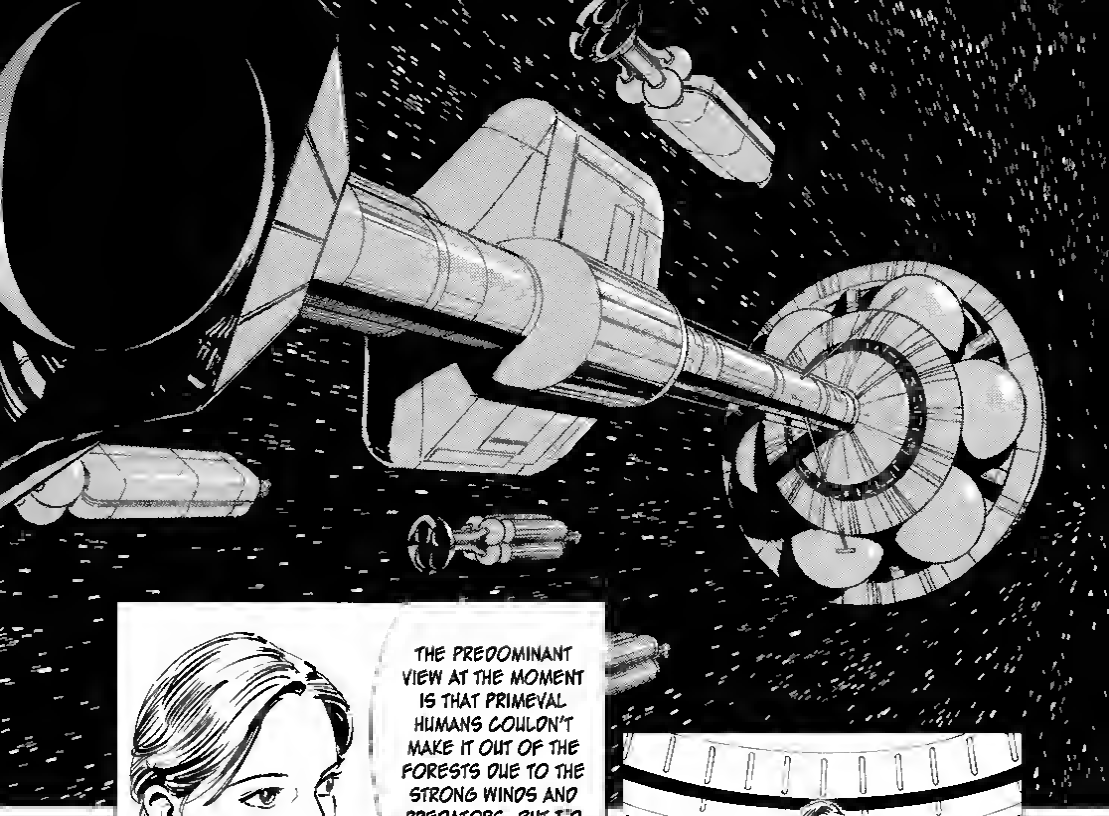
47


IF, 50,000 YEARS AGO, THE WIND DIED DOWN AS A RESULT OF THE FIRST APPEARANCE OF THE MOON, GRAVITATIONAL PULL WOULD STRENGTHEN AND THIS WOULD RESOLVE ALL MY QUESTIONS.
BOTH THE CLIMATE AND THE ATMOSPHERIC COMPOSITION MUST HAVE CHANGED...

20

I BELIEVE IT IS WORTH EXPLORING DR. HUNT'S HYPOTHESIS.

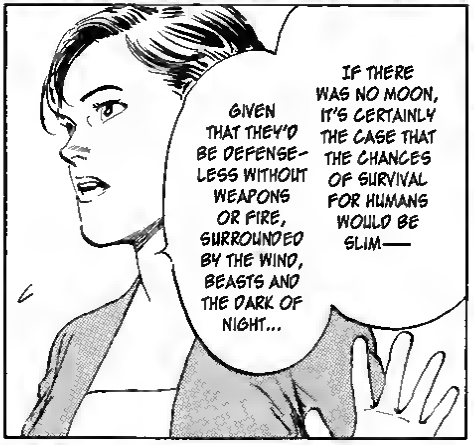
46



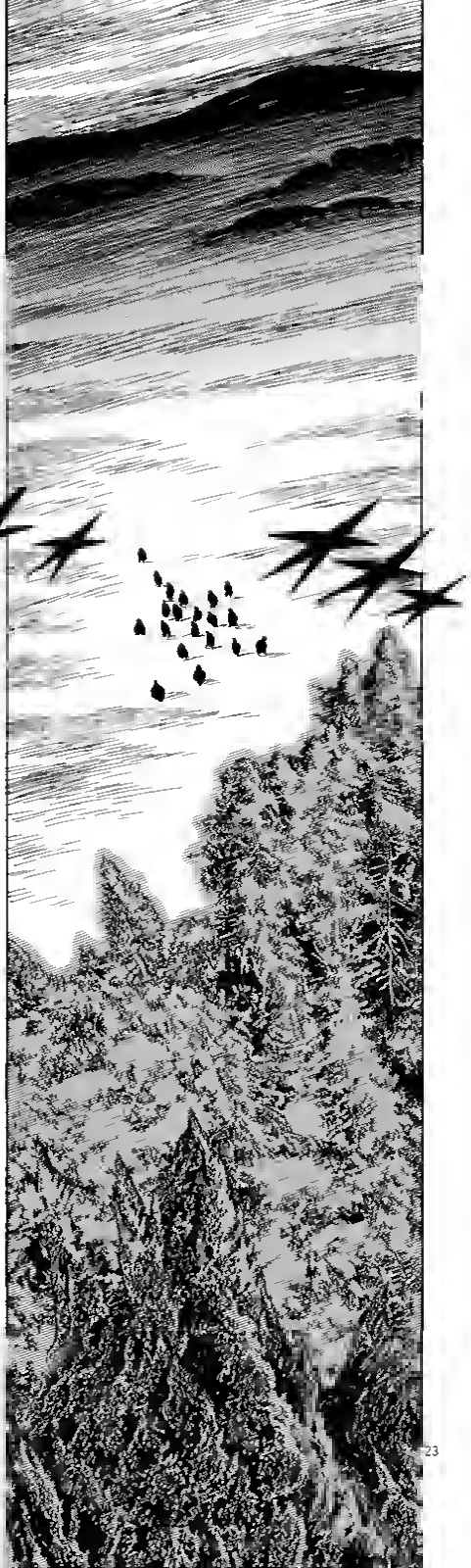
THE PREDOMINANT VIEW AT THE MOMENT IS THAT PRIMEVAL HUMANS COULDN'T MAKE IT OUT OF THE FORESTS DUE TO THE STRONG WINDS AND PREDATORS. BUT I'D LIKE TO PROPOSE AN ALTERNATIVE VIEW.

22

I'M NANA EMETT FROM THE ANTHROPOLOGY DEPARTMENT.


IF THERE WAS NO MOON, IT'S CERTAINLY THE CASE THAT THE CHANCES OF SURVIVAL FOR HUMANS WOULD BE SLIM——
GIVEN THAT THEY'D BE DEFENSE-LESS WITHOUT WEAPONS OR FIRE, SURROUNDED BY THE WIND, BEASTS AND THE DARK OF NIGHT...

BUT, ONE OF THEM MUST HAVE DISCOVERED——



CAVES—
A PLACE THAT WOULD PROTECT HUMANS FROM THE GALES AND BEASTS, FORMING THE CRADLE FOR EVOLUTION...